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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,500	03/22/2004	Francis R. Corrado	P18941	2780

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EXAMINER

DARE, RYAN A

ART UNIT	PAPER NUMBER
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2186

MAIL DATE	DELIVERY MODE
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08/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/806,500

Applicant(s)

CORRADO, FRANCIS R.

Examiner

Ryan Dare

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The rejections to the claims made under 35 U.S.C. 112 are withdrawn, due to the amendments submitted 3/21/07.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-42 are rejected under 35 U.S.C. 102(b) as being anticipated by King et al., US Patent 6,530,004.
4. With respect to claim 1, King teaches a method, comprising:

providing a source map indicating blocks of data striped across a first plurality of storage units and a destination map indicating blocks of data striped across a second plurality of storage units, wherein data is migrated from stripes indicated in the source map to corresponding stripes indicated in the destination map, in col. 5, lines 35-50 which describes a particular source map to destination map shown in fig. 5; and
5. in response to determining that the source stripe and the destination stripe occupy a same physical location on the storage units, writing the data from a source stripe to a copy area and writing the data from the copy area to a corresponding

destination stripe, in col. 8, line 40, through col. 9, line 7. Referring to the related fig. 6A, the destructive zone is identified as stripe numbers "0" through "B." The stripes in the destructive zone, that is, the stripes occupying the same locations in the expansion, are the stripes that are copied through the backup buffer, as disclosed in the cited section.

6. With respect to claim 2, King teaches the method of claim 1, further comprising: determining units of operation, wherein one unit of operation comprises one stripe indicated in the source map to migrate to one stripe indicated in the destination map, wherein the data is migrated by processing the units of operation, in col. 5, lines 26-27.

7. With respect to claim 3, King teaches the method of claim 2, further comprising: locking data in one source stripe in one unit of operation currently being migrated; and unlocking the locked data after completing the migration of the source data in the unit of operation, in col. 5, lines 26-30.

8. With respect to claim 4, King teaches the method of claim 2, further comprising: indicating a number of a current unit of operation being processed; and indicating data is being copied through the copy area in response to determining that the source stripe and destination stripe involved in the current unit of operation occupy the same physical locations, in col. 7, lines 13-25.

9. With respect to claim 5, King teaches the method of claim 4, further comprising: incrementing the current unit of operation in response to completing copying the source stripe to the destination stripe for one unit of operation; and indicating data is not being

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copied through the copy area in response to completing copying the source stripe to the destination stripe for one unit of operation, in col. 5, lines 26-30.

10. With respect to claim 6, King teaches the method of claim 4, further comprising:

determining whether data is indicated as being copied through the copy area after recovering from a failure, in col. 1, line 51 through col. 2, line 11;

writing the data from the copy area to the destination stripe in the indicated current unit of operation in response to determining that the data is indicated as being copied through the copy area, in col. 5, lines 4-30; and

continuing processing the units of operation to complete the migration of the source stripes to the destination stripes, in col. 5, lines 26-34.

11. With respect to claim 7, King teaches the method of claim 1, further comprising:

determining a depth of a source volume including the source stripes and a depth of a destination volume including the destination the destination stripes, in col. 5, line 51 through col. 6, line 14;

writing the source stripes in descending order from one source stripe at a first physical location of the source volume to the destination stripes in response to determining that the destination volume depth exceeds the source volume depth, in col. 6, line 53 through col. 7, line 12; and

writing the source stripes in ascending order from one source stripe at a last physical location of the source volume to the destination stripes in response to determining that the destination volume depth does not exceed the source volume depth, in col. 6, lines 15-52.

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12. With respect to claim 8, King teaches the method of claim 1, further comprising: determining whether an overlap comprising the source stripe and destination stripe occupying the same physical location is impermissible; and aborting the migration in response to determining that the overlap is impermissible, in col. 4, lines 50-57.

13. With respect to claim 9, King teaches the method of claim 8, wherein determining whether the overlap is impermissible comprises: determining a depth of a source volume including the source stripes and a depth of a destination volume including the destination stripes; determining a source physical location on one storage unit of a first block in a first stripe in the destination volume and a destination physical location on one storage unit of a first block in a first stripe in the source volume; and determining that the migration is impermissible in response to determining: (1) that the destination volume depth is less than or equal to the source volume depth and the destination physical location is greater than the source physical location or (2) that the destination volume depth is greater than the source volume depth and the destination physical location is less than the source physical location, in col. 5, line 51 through col. 7, line 12.

14. With respect to claim 10, King teaches the method of claim 1, wherein a number of the first plurality of storage units is different than a number of the second plurality of storage units, in col. 7, lines 50-55.

15. With respect to claim 11, King teaches the method of claim 1, further comprising: detecting a failure of one of the first plurality of storage units, in col. 1, lines 51-57;

rebuilding data from the failed storage units using parity data on the first plurality of storage units that did not fail, wherein the migration is performed to transfer the rebuilt data and the data in the first plurality of storage units that did not fail to the second plurality of storage units including the storage units of the first plurality that survived, in col. 5, lines 35-50.

16. With respect to claim 12, King teaches the method of claim 1, wherein the storage units comprise magnetic hard disk drives and wherein a Redundant Array of Independent Disk (RAID) algorithm is used to stripe the data to the disks, in col. 1, lines 25-39.

17. With respect to claim 39, King teaches the method of claim 1, further comprising: copying the source stripe directly to the destination stripe in response to determining that the source stripe and the destination stripe do not occupy the same physical location on the storage units, in col. 8, line 40, through col. 9, line 7, where only the stripes in the destructive zone go through the backup buffer.

18. With respect to claims 13-23 and 40, Applicant claims a system that corresponds to the method of claims 1-11 and 39, and is therefore rejected using similar logic.

19. With respect to claims 24-26 and 41, Applicant claims a system that corresponds to the method of claims 1, 4, 12 and 39, and is therefore rejected using similar logic.

20. With respect to claims 27-38, Applicant claims an article of manufacture that corresponds to the method of claims 1-12 and is therefore rejected using similar logic.

Response to Arguments

21. Applicant's arguments filed 3/21/07 have been fully considered and the Examiner has accordingly adjusted the cited passage of King for the independent claim 1. The examiner's prior rejection pointed to the case where the delta value equals zero, instead of pointing to the section which describes that data in the destructive zone is copied through a backup buffer, regardless of whether the delta value is zero or not. The examiner cites the example in col. 8, line 40 through col. 9, line 7, and the associated fig. 6A as an example of how King teaches this. The Applicant contends that King doesn't make the determination of whether a particular source stripe occupies the same location as a particular destination stripe; rather that King only makes the determination that a source stripe lies in the destructive zone (pages 13-16). However, in the simplest case, when there is only one stripe on the source volume, this is in fact the case. Referring to fig. 6A, if the source storage units only contain stripe 0, the destructive zone is stripe 0, and is copied through the backup buffer. Therefore, you are determining that the source stripe and the destination stripe occupy a same physical location on the storage units, writing the data from a source stripe to a copy area and writing the data from the copy area to a corresponding destination stripe.


Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Dare whose telephone number is (571)272-4069. The examiner can normally be reached on Mon-Fri 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Kim can be reached on (571)272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ryan Dare/
Ryan Dare
August 18, 2007


MATTHEW KIM
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